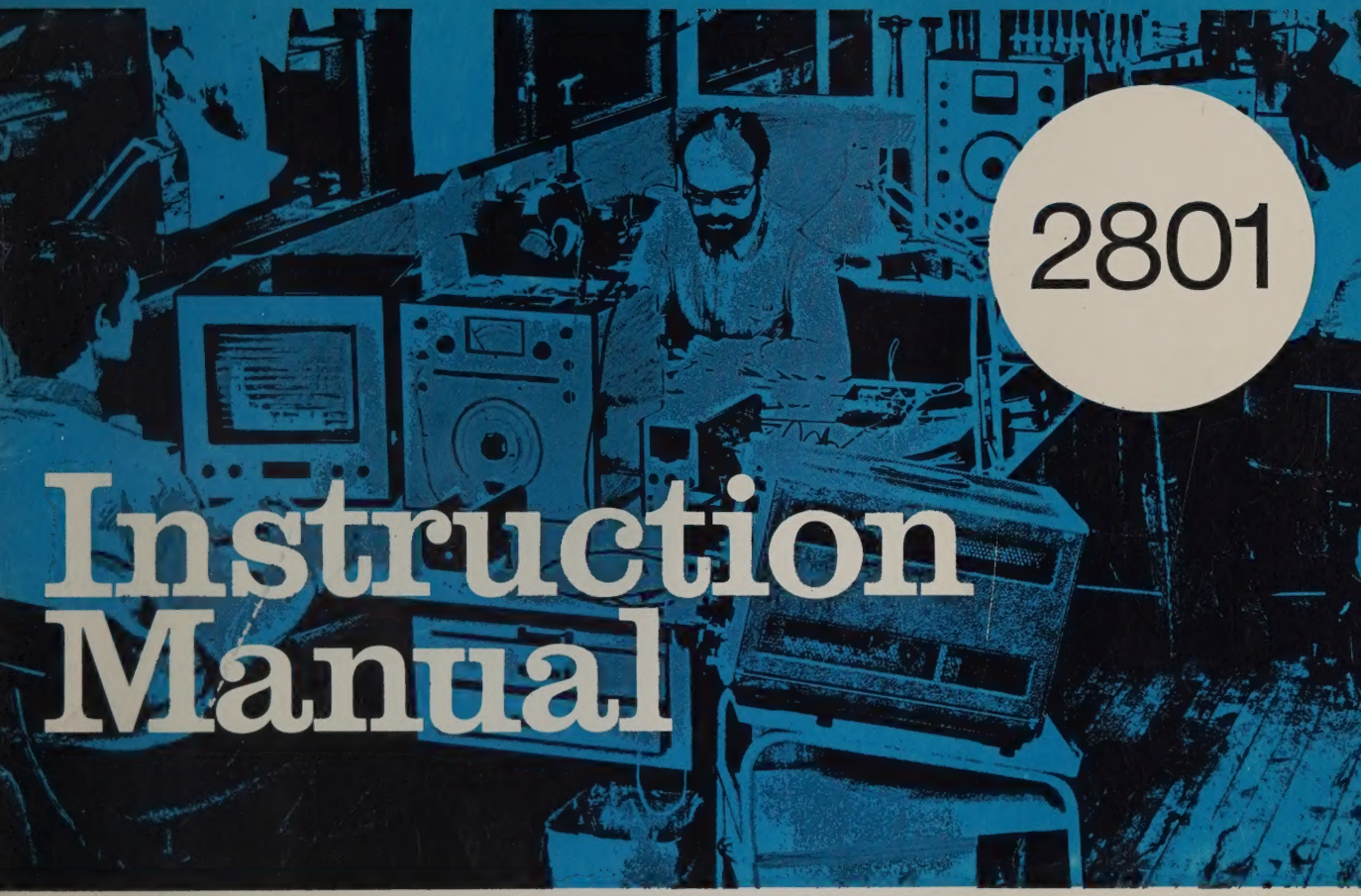
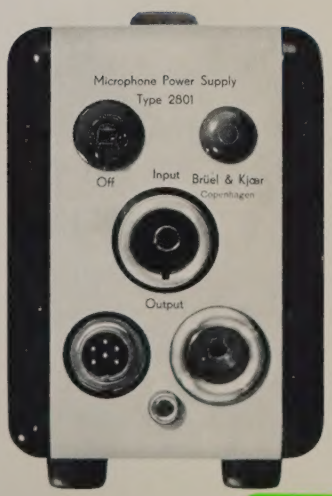


2801

Instruction Manual



Microphone Power Supply
Type 2801

A mains-powered unit providing a single channel stabilised supply and polarisation voltage for B & K condenser microphones and preamplifiers, where these are not otherwise available from measuring or recording instrumentation.

BRÜEL & KJÆR

MP MASTER
MA26191

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MICROPHONE POWER SUPPLY

TYPE 2801

Reprint June 1974

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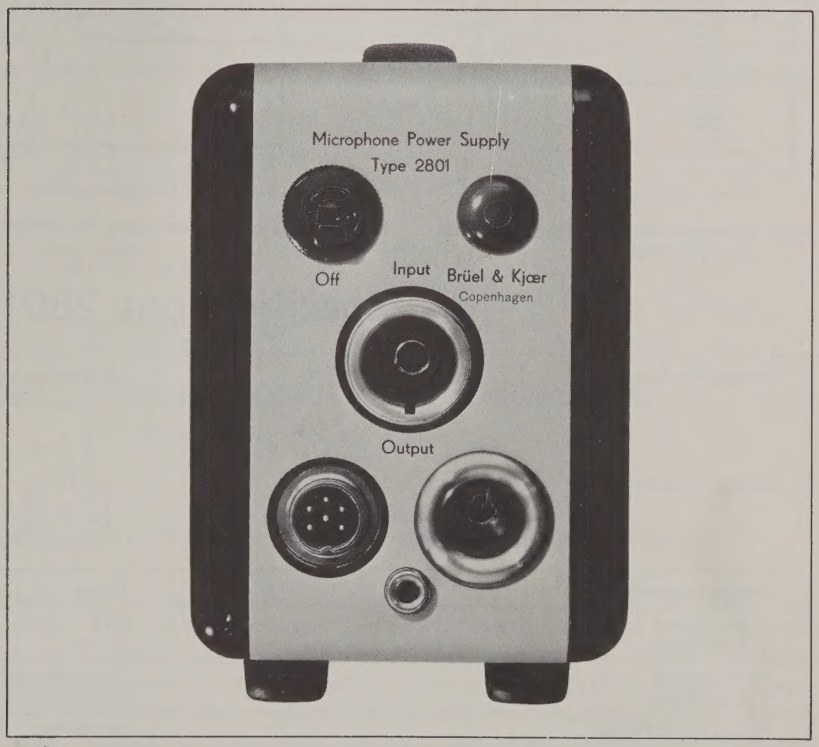
type 2801

Microphone Power Supply



FEATURES:

- Four output impedances
- Connects to any volt indicator
- Single ended or symmetrical output
- Allows long inter-connection cables

USES:
(with B & K condenser microphones)

- Multi channel tape recording
- Phase shift and rise time measurements with oscilloscopes
- Oscilloscope triggering
- Noise monitoring stations

The Microphone Power Supply Type 2801 is intended for use with the Brüel & Kjær condenser microphone or vibration pick-up assemblies in cases where B & K Measuring Amplifiers or Analyzers are either not available or not necessary. A low output impedance allows the use of extremely long cables between the Power Supply and succeeding measuring equipment. The 2801 has been designed as a portable, line driven unit for two specific purposes:

1. To supply the necessary drive voltages to the preamplifiers Types 2615, 2618, 2619, 2627, and 4292 and the polarization voltage to the B & K condenser microphone cartridges (200 V).
2. To transform the output impedances of the various preamplifiers into impedances of 50 Ω, 200 Ω, or 200 Ω symmetrical.

In cases where it is not necessary to transform output impedances, it is possible to take the preamplifier output directly through the Power Supply. See Fig. 1.

The Microphone Power Supply can also be used with the Two Channel Microphone Selector Type 4408 which enables the output from either of two microphones, two vibration pick-ups, or one microphone and one vibration pick-up and associated preamplifiers to be alternately switched to the input of a single amplifier.

The frequency response of the various preamplifiers is not influenced by the Power Supply when used in the "Direct" position. However, when the transformer outputs of the Power Supply are used, the load and/or cable length which is connected to them will influence the frequency response of the preamplifier/power supply combination. See Fig. 2.

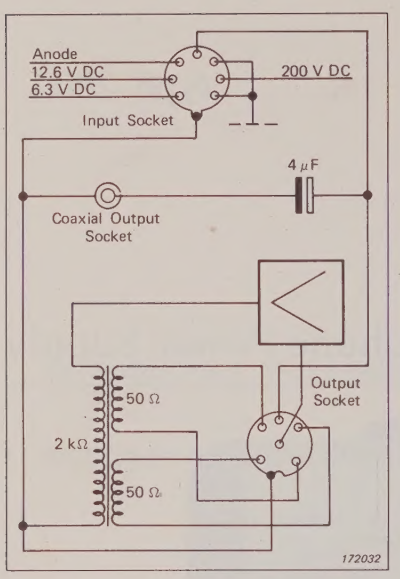


Fig.1. Schematic drawing of the Power Supply Type 2801

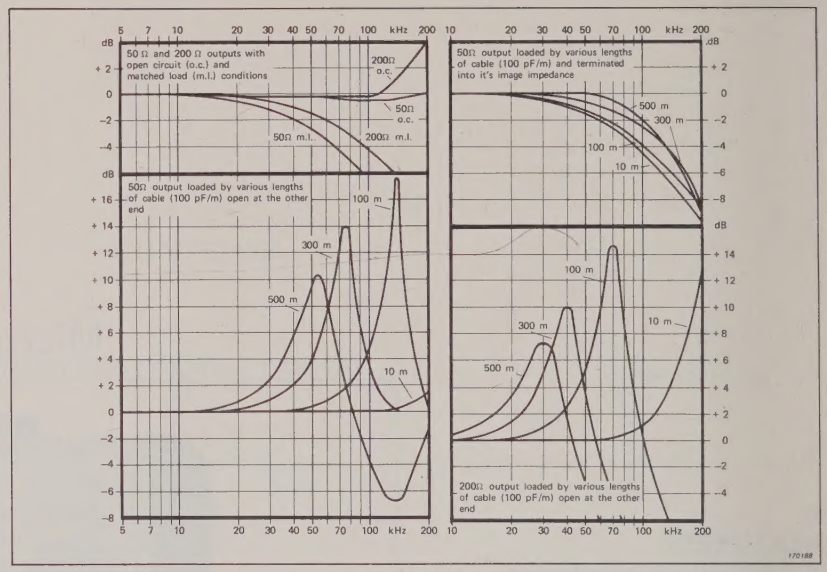
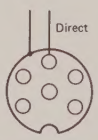
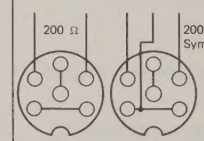
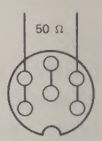

50 Ω and 200 Ω outputs with open circuit (o.c.) and matched load (m.l.) conditions
200Ω o.c.
50Ω o.c.
50Ω m.l.
200Ω m.l.
50Ω output loaded by various lengths of cable (100 pF/m) open at the other end
100 m
300 m
500 m
10 m
50Ω output loaded by various lengths of cable (100 pF/m) and terminated into it's image impedance
200Ω output loaded by various lengths of cable (100 pF/m) open at the other end
dB
kHz
170188

Fig.2. Frequency response curves for various loads of the transformer/emitter follower stage

Specifications 2801

Frequency Range:		same as preamp.	up to 200 kHz depending on load	
Output Impedance:		 Direct	 200 Ω, 200 Ω Symmetrical	 50 Ω
Output Connection:		Direct	200 Ω	50 Ω
Input/Output Voltage Ratio:	No Load	1 : 1 (0 dB)	3.16 : 1 (−10 dB)	6.3 : 1 (−16 dB)
Input/Output Voltage Ratio:	Loaded	Depending on Capacitive load	4 : 1 (−12 dB)	8 : 1 (−18 dB)
Peak Output Voltage:		as preamp.	1 V	0.5 V
Noise 20 Hz to 200 kHz:	750 Ω // 50 pF Across input	30 µV	10 µV	5 µV
Hum 50 Hz to 180 Hz:		8 µV	3 µV	1.5 µV

Polarization Voltage:
200 V.

Stability:
Polarization voltage will vary by less than 1% for a 10% variation in line voltage.

Power Supply:
100, 115, 127, 150, 220, or 240 Volts AC 50 to 400 Hz.

Power Consumption:
Approx. 10 W (dependent on load).

Dimensions (excl. knobs & feet):
Height 11.5 cm (5.9 in)
Width 8.4 cm (3.3 in)
Depth 20.0 cm (7.9 in).

Weight:
2.2 kg (4.8 lb).

Accessories Included:
Power Cable
Screened plug JP 0101
Multiplug JP 0024
Fuses and pilot lamp.

2. DESCRIPTION AND CHARACTERISTICS

2.1. INPUT

The 2801 contains stabilised supply and polarisation voltages for preamplifiers and condenser microphones. Variation of these voltages is less than 1% for a 10% variation in mains supply voltage. Connection of the INPUT socket is as shown in Fig.2.1. The socket accepts plug JP 0701.

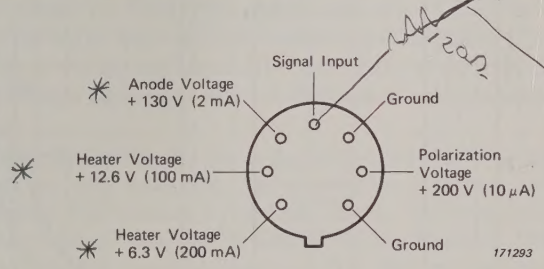


Fig.2.1. Connection of the INPUT socket (viewed from outside)

2.2. OUTPUT

The input signal is fed to two OUTPUT sockets which may be used simultaneously.

Between the input and the coaxial output (which accepts plug JP 0101) of the 2801 is a 4 μF blocking capacitor. This socket can be conveniently used when B & K microphone preamplifiers are to be connected to instrumentation which does not contain blocking capacitance. The coaxial output may be loaded by 50Ω with no limiting effect on the dynamic range of the B & K microphone and preamplifier combination. However, the effect of impedances lower than 50 kΩ on frequency response should be determined from the characteristics of the preamplifier in use, as given in the Instruction Manual for the preamplifier.

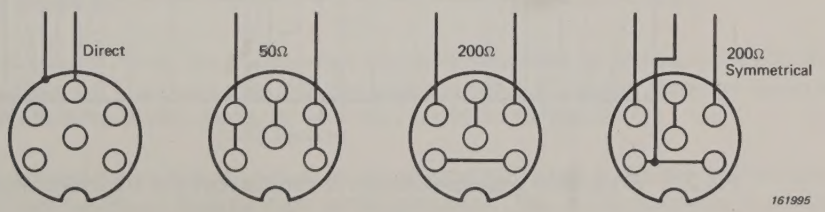


Fig.2.2. Connection of the six-pin OUTPUT socket for various output impedances

The six-pin socket allows a number of output connections and an emitter-follower stage and a transformer have been incorporated to provide output impedances of 50 ohms, 200 ohms and 200 ohms symmetrical as well as direct output. Fig.2.2 shows the connections to be made to this socket to obtain the various output facilities. The connection marked

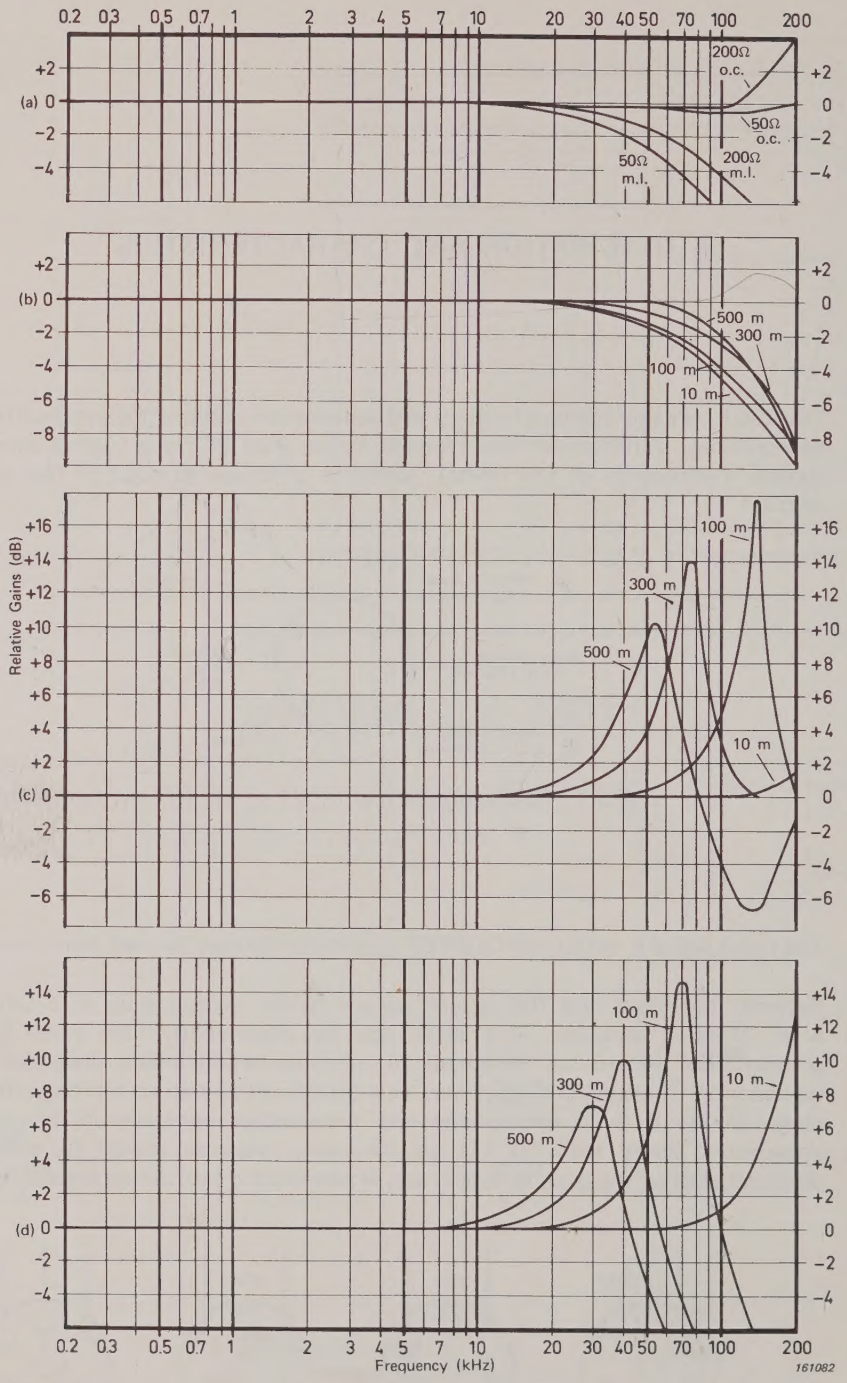


Fig.2.3. Frequency response curves for various loads of transformer/emitter follower stage.

(a) The curves marked 200Ω o.c. and 50Ω o.c. refer to open circuit conditions of the 200Ω and 50Ω output impedance connections respectively. The curves marked 200 m.l. and 50 m.l. refer to the same outputs connected to matched loads (i.e. 50Ω to 50Ω 200Ω to 200Ω).

(b) 50Ω output loaded by various length of cables, the cable being terminated into its image impedance.

(c) 50Ω output loaded by various length of cable, the cable being "open" at the other end.

(d) 200Ω output loaded by various length of cable, the cable being "open" at the other end.

"Direct" connects straight through the instrument from input to output. All the other connections of the multi-poled output socket connect the emitter-follower and transformer between the input and output of the Power Supply. The frequency response will, when these connections are used, be linear in the range from 20 Hz to 20 kHz.

Above 20 kHz the characteristics of this stage appear as shown in Fig.2.3. The curves show that it is possible to vary the high frequency response within rather wide limits. Therefore, if this part of the frequency range is of interest, one of the optimum characteristics for the particular application can be chosen. To make a rough calculation it may be helpful to know that many screened cables have a capacity of 70 to 100 pF/m. It should be emphasized that in every instance the transformer stage responds linearly to frequencies up to and well above 20 kHz.

The input to output attenuation of the transformer stage for the 200Ω output is approximately 10 dB unloaded. By loading the output with 200Ω the attenuation will be 12 dB. For the 50Ω output the input to output attenuation will be approximately 16 dB unloaded, and 18 dB when loaded by 50Ω. When these outputs are used for absolute measurements, it is recommended to calibrate the complete measuring arrangement, for example by means of the Pistonphone 4220 or the Sound Level Calibrator 4230 in the case of sound level measurements, or by the Accelerometer Calibrator 4291 in the case of vibration measurements.

Adjustment of the sensitivity of the microphone/preamplifier/power supply sensitivity will normally be made at the measuring instrumentation. However, with a multiplexer switching arrangement between the outputs of several 2801s, the only possible compensation for the sensitivities of the different channels is before the multiplexer. This can be done at the Power Supply within very small limits (approx. ± 0,5 dB) by adjusting the polarisation voltage supplied to the microphone, as described in section 2.4. However, when adjusting polarisation voltage, full attention should be paid to effects on the frequency response of the microphone in use, as indicated in the Instruction Manual for the microphone. Where the range of microphone sensitivity variation between channels is too great, or in the case of vibration measurements where the preamplifier itself has no gain adjustment, it is necessary to use an external attenuator in the output signal line of each 2801.

2.3. GROUND CURRENTS

In the design of the Microphone Power Supply special care has been taken to minimize ground current due to stray capacitance from the power transformer by using a grain-orientated C-core transformer. Also stray induction is considerably reduced by heavy screening and by adjusting the mounting of the output transformer for minimum hum pick-up separately in each individual Power Supply. It may, however, be necessary to ensure that the equipment is correctly grounded.

The ground current from the 2801, when correctly grounded, is approximately 4 μA, which means a voltage of 4 μV per ohm for the attached cable (Common screened cables of good quality will normally have a resistance of 1 ohm per 100 m length).

If the Microphone Power Supply is used in connection with other mains driven instruments it is important that the Power Supply itself is not grounded. The ground connection shall be made at the connected instrument, see also Fig.2.4(a). When the 2801 is used in conjunction with battery-driven instruments the ground connection should be made at the Power Supply, see Fig.2.4(b). Using the 200 ohms symmetrical output it is possible to eliminate hum by employing a two-cored screened cable and grounding this cable at the connected instrument as shown in Fig.2.4(c). Several hundred meters of cable can then be employed.

Furthermore, it is important that the Power Supply is connected correctly to the mains. Normally one of the mains leads is the neutral of a three-phase system and this neutral lead

should be connected to the "zero end" of the mains transformer. If the hum level in the measuring arrangement is too high, the mains may be connected wrongly. This can be remedied by simply interchanging the two mains wires.

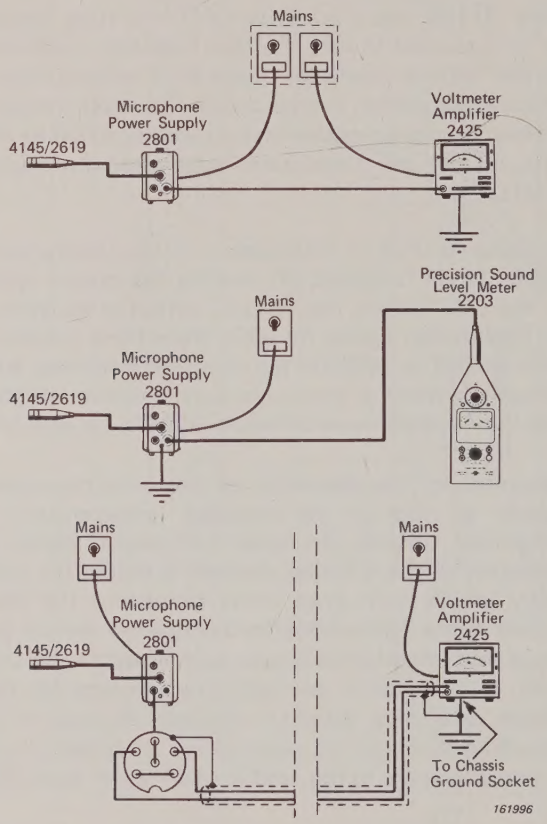


Fig.2.4. Various methods of ground connection to minimize hum from the Microphone Power Supply

(a) 2801 used in conjunction with other mains driven measuring instruments

(b) 2801 used in conjunction with battery-operated instruments

(c) Correct use of the 200 ohms symmetrical output facility of the 2801.

2.4. ADJUSTMENT OF SUPPLY VOLTAGES

The microphone polarisation voltage delivered from the Power Supply may, if necessary, be adjusted. To do so the left-hand side cover of the Power Supply should be removed by unscrewing the three holding screws on the right-hand side cover. Adjustment can be made by means of a potentiometer shown in Fig.2.5, and the polarisation voltage should be measured between the pins marked "Polarization Voltage" and "Ground".

It is important to use a voltmeter with a maximum consumption of 50 μA. When extremely long microphone cables (more than 100 meters) are used between the input of the Power Supply and the B & K Cathode Follower or Preamplifier, it may be necessary to adjust the voltage to compensate for the losses in the cable. This can be made by means of a wire-wound resistor P2 (Fig.2.6), by moving the "tap" downwards, whereby a higher voltage is obtained.

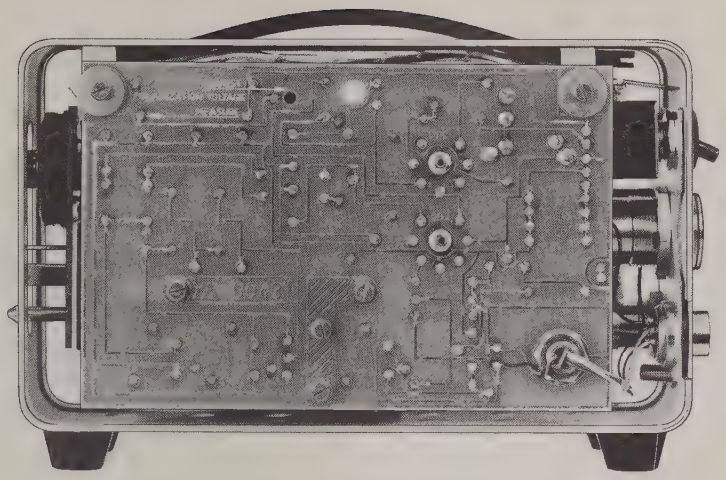


Fig.2.5. Polarisation voltage adjustment

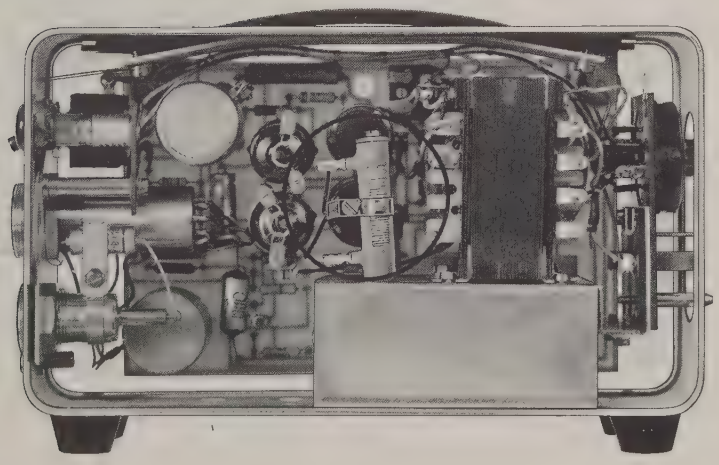


Fig.2.6. Adjustment of 6,3 V filament supply

3. APPLICATIONS

The Microphone Power Supply is used whenever a sound is to be measured or recorded with instrumentation that is not provided with a PREAMP. INPUT socket.

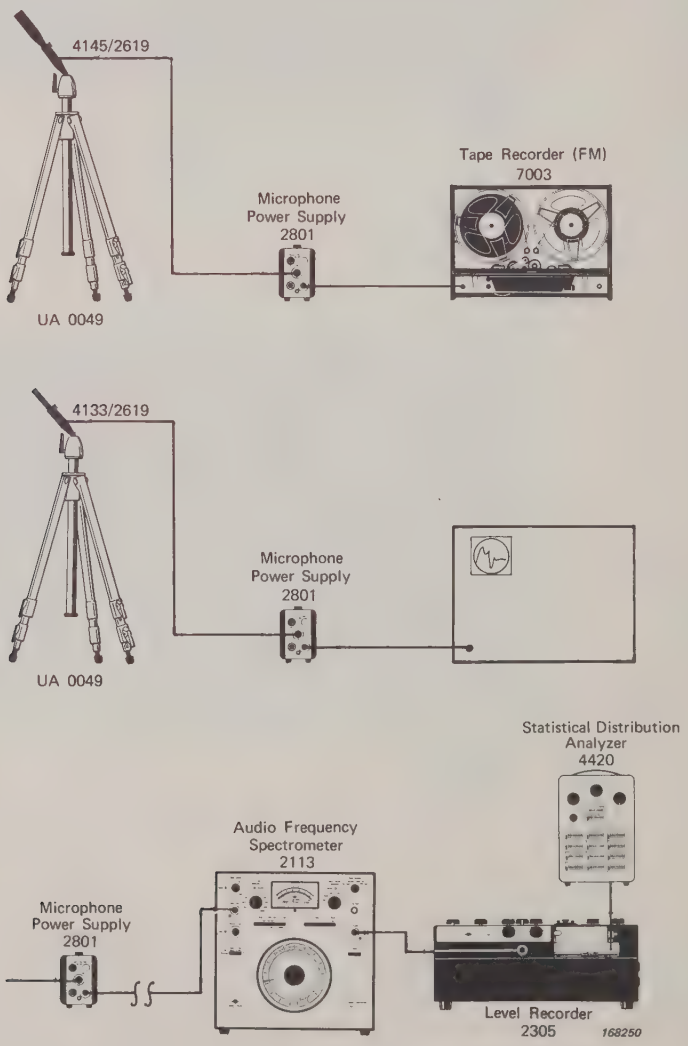


Fig.3.1. Typical measuring systems with Microphone Power Supply Type 2801

(a) Tape recording

(b) Oscilloscope measurements

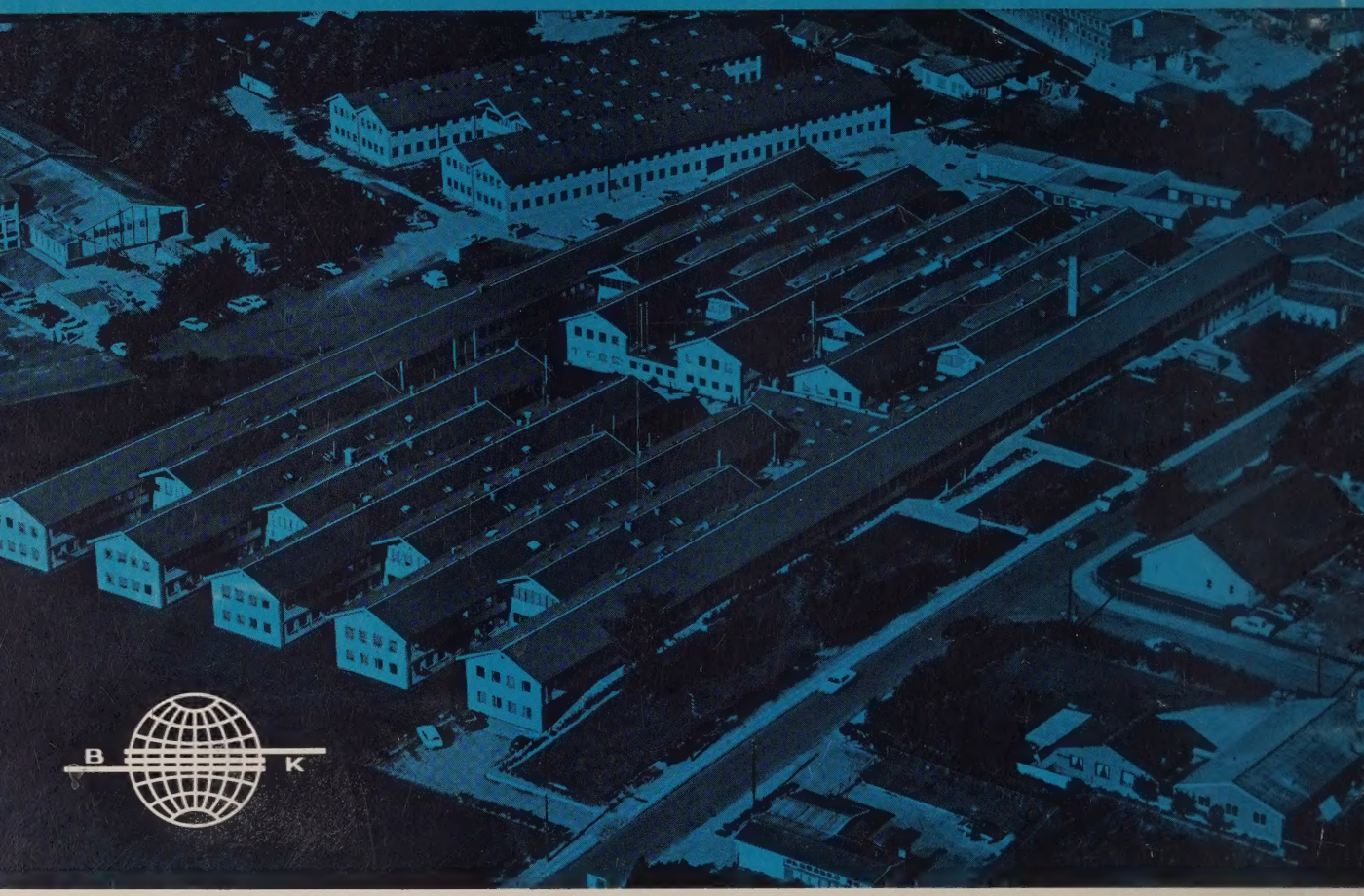
(c) Remote measurements with Level Recorder and Statistical Distribution Analyzer

Typical applications include:

Tape recording of sound
Oscilloscope measurements
Remote monitoring measuring stations

Fig.3.1 shows some typical set-ups.
Note that a two-channel microphone power supply is available (Type 2807). This is sometimes more convenient in multi-channel systems. The Power Supply Type 2805 is also available for supplying up to ten accelerometer preamplifiers.

The battery driven Microphone Power Supply Type 2804 is also a two channel system. However, this does not provide sufficient current to drive the Type 2615 Cathode Follower.



BRÜEL & KJÆR instruments cover the whole field of sound and vibration measurements. The main groups are:

ACOUSTICAL MEASUREMENTS
Condenser Microphones
Piezoelectric Microphones
Microphone Preamplifiers
Sound Level Meters
Precision Sound Level Meters
Impulse Sound Level Meters
Standing Wave Apparatus
Noise Limit Indicators
Microphone Calibrators

ACOUSTICAL RESPONSE TESTING
Beat Frequency Oscillators
Random Noise Generators
Sine-Random Generators
Artificial Voices
Artificial Ears
Artificial Mastoids
Hearing Aid Test Boxes
Audiometer Calibrators
Telephone Measuring Equipment
Audio Reproduction Test Equipment
Tapping Machines
Turntables

VIBRATION MEASUREMENTS
Accelerometers
Force Transducers
Impedance Heads
Accelerometer Preamplifiers
Vibration Meters
Accelerometer Calibrators
Magnetic Transducers
Capacitive Transducers
Complex Modulus Apparatus

VIBRATION TESTING
Exciter Controls — Sine
Exciter Controls — Sine — Random
Exciter Equalizers, Random or Shock
Exciters
Power Amplifiers
Programmer Units
Stroboscopes

STRAIN MEASUREMENTS
Strain Gauge Apparatus
Multi-point Panels
Automatic Selectors

MEASUREMENT AND ANALYSIS
Voltmeters and Ohmmeters
Deviation Bridges
Measuring Amplifiers
Band-Pass Filter Sets
Frequency Analyzers
Real Time Analyzers
Heterodyne Filters and Analyzers
Psophometer Filters
Statistical Distribution Analyzers

RECORDING
Level Recordes
Frequency Response Tracers
Tape Recorders

DIGITAL EQUIPMENT
Digital Encoder
Digital Clock
Computers
Tape Punchers
Tape Readers

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